*the Public Schools: Questions and Answers**, a pamphlet published by a broad spectrum of religious and civil liberties groups.

EXCUSAL FROM RELIGIOUSLY-OBJECTIONABLE LESSONS

15.Schools enjoy substantial discretion to excuse individual students from lessons which are objectionable to that student or to his or her parent on the basis of religion. Schools can exercise that authority in ways which would defuse many conflicts over curriculum content. If it is proved that particular lessons substantially burden a student's free exercise of religion and if the school cannot prove a compelling interest in requiring attendance the school would be legally required to excuse the student.

TEACHING VALUES

16. Schools may teach civic virtues, including honesty, good citizenship, sportsmanship, courage, respect for the rights and freedoms of others, respect for persons and their property, civility, the dual virtues of moral conviction and tolerance and hard work. Subject to whatever rights of excusal exist (see ¶15 above) under the federal Constitution and state law, schools may teach sexual abstinence and contraception; whether and how schools teach these sensitive subjects is a matter of educational policy. However, these may not be taught as religious tenets. The mere fact that most, if not all, religions also teach these values does not make it unlawful to teach them.

STUDENT GARB

17. Religious messages on T-shirts and the like may not be singled out for suppression. Students may wear religious attire, such as yarmulkes and head scarves, and they may not be forced to wear gym clothes that they regard, on religious grounds, as immodest.

RELEASED TIME

18. Schools have the discretion to dismiss students to off-premises religious instruction, provided that schools do not encourage or discourage participation or penalize those who do not attend. Schools may not allow religious instruction by outsiders on premises during the school day.●

INDIVIDUAL RIGHTS AND DOMESTIC TERRORISM

● Mr. DORGAN. Mr. President, the tragedy that took place on April 19 at the Federal building in Oklahoma City was an unspeakable horror. This was a cowardly and heinous act by deranged people whose obsessions led to the killing of innocent men, women, and children. I want the people who perpetrated this act to be hunted down and to be appropriately, quickly, and harshly dealt with by our criminal justice system.

The tragic bombing at Oklahoma City has sparked a debate in our country about how to prevent a tragedy of this type from occurring again. It is important to understand that in a free country it is virtually impossible to provide any ironclad protection against the violent acts of deranged people. But part of being free is the requirement to ensure civil order. That is the job that we ask our law enforcement officials to do.

The question we must now ask ourselves is how can we protect Americans without infringing on the liberties guaranteed by the Constitution. People have a constitutional right to criticize their government and the institutions of this Nation. This right not only applies to people we like—our neighbors and our friends—it also applies to people we do not like and associations we do not care for. This right must be preserved.

The Oklahoma City bombing has also sparked a debate about militia groups in our country. People have every right to join organizations. However, I have heard some militia leaders say the Federal Government is their avowed enemy when they have been interviewed on television programs. Some of them talk in terms of violence and battles. I think that is an unhealthy attitude and I think that thinking can lead to violence.

I want to emphasize my commitment to preserving the fundamental freedoms that are guaranteed to all Americans under our Constitution. But I also want to emphasize that I join those in our country who want to send a message to the people who cross the line between criticizing our government and advocating or resorting to violence or terrorism. There is no constitutional right to commit violence in our country. There is no constitutional right to kill innocent men, women, and children. And those who do should be dealt with aggressively by our law enforcement agencies.

It is important that we discuss these issues in a thoughtful, reasonable, and constructive way. In America, we can disagree without being disagreeable. We can have a debate without shouting. And we can work together to fix things that are wrong in this country and to make this a better place. Most importantly, we should protect and cherish our constitutional rights. One of those rights is to live in a free country—free from the unspeakable horrors that were perpetrated on innocent people in Oklahoma City.●

IN HONOR OF ABBA EBAN

● Mr. LAUTENBERG. Mr. President, I rise this morning to honor a great statesman on the occasion of his 80th birthday.

Abba Eban—statesman, diplomat, scholar, and author—was born in South Africa on February 2, 1915. As a young man growing up in London, Mr. Eban learned fluent Hebrew and became an active member of the Zionist movement.

He studied at Cambridge University, and became a lecturer in Hebrew, Arabic, and Persian literature.

Mr. Eban served in World War II, where he was assigned to Jerusalem as liaison officer of Allied Headquarters. After the war, he entered the service of the Jewish agency in Jerusalem. In 1947, he became the agency's liaison officer with the U.N. Special Commission on Palestine.

In 1948, Mr. Eban was appointed as Israel's representative to the United Nations and in this capacity, he appeared before the General Assembly to plead successfully for his country's admission to the United Nations.

In 1950, Abba Eban was appointed Israel's Ambassador to the United States. At 35, he was the youngest person to hold such a high rank in Washington's diplomatic corps.

In 1959, after returning to Israel, Mr. Eban was elected to the Israeli Knesset as a member of the Labor Party. He joined the Cabinet as Minister Without Portfolio, was appointed Minister of Education and Culture in 1960, and in 1963, he became Deputy Prime Minister under Prime Minister Levi Eshkol.

In 1966, Mr. Eban became Israel's Minister for Foreign Affairs, a position he held until June 1974.

Through the years, Mr. Eban has been recognized in numerous arenas for his diplomatic prowess and his contributions to the state of Israel. He holds honorary doctorates from several universities, including New York University, Boston University, the University of Maryland, and the University of Cincinnati. He is a fellow of the World Academy of Arts and Sciences, and the only living member of the Orator's Hall of Fame.

Mr. Eban recently served as host and narrator of ''Israel: A Nation is Born,'' a five-part historical television miniseries, documenting 40 years of Israel's history.

Mr. President, the Israeli people have been fortunate to count Mr. Eban among their leaders. He has consistently represented the Jewish state with dignity, with strength and with aplomb. As he celebrates this birthday, we should all take this opportunity to celebrate his many accomplishments.●

HYDROGEN—AN ENERGY SOURCE FOR THE FUTURE

● Mr. HARKIN. Mr. President, I have long advocated greater investment in the development of sustainable hydrogen energy. Hydrogen has a tremendous potential to be the energy carrier of the future. It is an ideal energy source as it is plentiful, efficient and clean burning. An excellent article describing the many advantages of hydrogen as an energy source appeared in the March 19, 1995 edition of the Los Angeles Times Magazine. I urge all of my colleagues to read this article and I ask that the text of the article be printed in the RECORD.

The article follows:

[From the Los Angeles Times Magazine, March 3, 1995]

HARNESSING THE BIG H

HYDROGEN SEEMS THE IDEAL ENERGY SOURCE—PLENTIFUL, EFFICIENT AND CLEAN. CAN SOMETHING THIS PERFECT BE REAL? JUST ASK THE JAPANESE

(By Alan Weisman)

West of Denver, Interstate 70 enters Golden, Colo., and begins to curl through the foothills of the Rockies. There is bisects an unassuming clump of brick buildings—the National Renewable Energy Laboratory.

Among the government's national laboratories, NREL is modest, operating on a fraction of the billions commanded by atomic research giants like Sandia, Los Alamos and Lawrence Livermore. Inside, there are no monstrous particle accelerators; experiments here are more likely to proceed in test-tube racks, bell jars and small glass beakers, like the one John Turner is filling with a clear solution of water and household lye.

Turner, a chemist with a graying blond beard and gold-rimmed glasses, sticks a narrow glass slide, coated on one end with a black, mica-like substance, into the lye solution. The humming lab ventilators mask the sound of the vehicles whizzing by on the nearby interstate, but Turner has spent most of his career here, and during those years he's always had the cars in mind. As he aims a pencil-thin beam from a high-intensity lamp at the flask, he puts it this way: ''Suppose someone announced he intended to ship millions of gallons of a carcinogenic, explosive fluid that emits toxic fumes through our downtown and then store it underground in our neighborhoods. People would rise up in anger, right?''

Wrong. Just outside on I–70, cars are spraying residues of that very poison all over the mountains. After 11 decades of tinkering, their internal combustion engines are miracles of technology with hundreds of moving parts. Yet various laws of physics still limit their ability to extract energy from petroleum. Nearly three-fourths of its potential simply radiates away or pours, partly combusted, out the tailpipe, rising in geologic layers of brown murk until the Rockies themselves dwindle to ghostly smudges.

John Turner is among a cadre of scientists trying to suppress what he regards as humanity's most pervasive, and self-inflicted, epidemic. In a little more than a century, since Thomas Alva Edison invented the light bulb and Henry Ford began to mass-produce automobiles, man-made energy has become the most addictive drug in history. Everybody today was born into the this dependency: No one any longer can imagine life without electricity or motorized vehicles. To slake our craving, we must dose ourselves and our surroundings daily with deadly filth. This ritual is now doomed to spread, as China, India and other developing nations bestow family cars and refrigerators upon 2 billion new recruits to the industrial age.

Getting an entire world to kick a habit is futile, so Turner is trying to at least find us a clean needle. As the beam strikes the shiny black square centimeter of semiconductor glued to the submerged portion of his slide, the surrounding liquid begins to fizz. Electrons stimulated by light, he explains, are rushing to the semiconductor's surface, hitting water molecules and splitting them into their component parts: oxygen and hydrogen.

He watches the tiny bubbles rise. ''For years,'' he says, ''this has been the Holy Grail of photoelectric chemists. We're witnessing the direct conversion of solar energy into hydrogen.''

Cape Canaveral, June, 1994: A group of visiting scientists and engineers is touring the John F. Kennedy Space Center in blue-and-white air-conditioned buses. They're here for the World Hydrogen Energy Conference, a biennial event born of the energy crisis 20 years earlier. Although the price of petroleum has since calmed considerably (adjusted for inflation, it's actually cheaper than pre-1973), a groundswell of concern, coupled with numerous breakthroughs, has ballooned this gathering to nearly 600 researchers from 34 countries. They've come to Canaveral this year for inspiration: The huge tank on the pad, where the shuttle Columbia will presently lift spaceward, is filled with pure hydrogen.

Since even before the moon shots, all U.S. astronauts' heat, electricity and drinking water have been derived from hydrogen. The U.S. space program is the first step toward realizing these scientists' dream: to switch the planet from an economy fueled with dirty coal and petroleum to one run on clean hydrogen.

The idea of something so ubiquitous—hydrogen is the most abundant element composing three-fourths of the mass of the universe—replacing diminishing fossil fuels seems the stuff of fiction. Once, in fact, it was: In 1870, Jules Verne's ''Mysterious Island'' described a world that would one day derive ''an inexhaustible source of heat and light'' from water's component parts.

Back then, Verne didn't realize that this source was also virtually pollution-free. The cycle is so elegant it seems nearly miraculous: Separate water into its two constituent gases, hydrogen and oxygen. Burn the hydrogen for fuel, and it re-couples with oxygen to form water again. No nasty particulates, no insidious carbon monoxide, no eye-stinging ozone or sulfur dioxide (at high temperatures, however, small, controllable amounts of nitrous oxides can form when hydrogen is burned in the presence of air). Mainly, though, hydrogen's exhaust is plain water vapor—which can then be recaptured and neatly converted again to hydrogen.

According to Bill Hoagland, founder of NREL's hydrogen program, it would take less than a gallon of water to get the same range from hydrogen that cars currently get from a gallon of gasoline. Because hydrogen can be made anywhere. I'm told repeatedly, there would be no more dependency on imported oil. No more OPEC. Maybe no more global warming, either, because it emits no greenhouse gases. As for hydrogen's unfortunate association with bombs and blimps, like the ill-fated Hindenburg, Hoagland reminds me that fossil fuels also readily explode, and studies rate hydrogen safer because it's nontoxic and dissipates quickly.

It seems like the perfect fuel. Yet, these scientists insist, it's been under-researched, under-funded and virtually ignored in Detroit, which perseveres in its allegiance to petroleum, and in Washington, which persists in keeping troops ready to defend the Persian Gulf.

So why aren't we leaping at this chance to end pollution, energy wars and economic bondage to a few privileged locations that float atop the earth's ebbing supplies of oil? Much of it comes down to money and the seemingly incontestable reign of the petroleum industry. Unlike natural gas, to which hydrogen is often compared, you can't dig a hole and find it. To tap hydrogen's energy, you have to expend energy because it's always combined with something else. Having to un-combine it makes it more expensive, at least in the near term, than crude petroleum products, including natural gas. And no alternative-energy constituency has the clout to buck powerful fossil-fuel lobbies and find a way to pay for retrofitting the world for a brand-new technology.

Currently, the U.S. Department of Energy allots hydrogen about one-ninetieth of what it spends on continuing petroleum research. (And two-thirds of the DOE's budget doesn't go for energy at all, but for nuclear weapons research and cleanup.) Nor has the public thus far demonstrated much interest in trading the ease of dirty energy, available at the turn of an ignition key or click of a light switch, for a major commitment to something cleaner and renewable.

Yet the learned crowd gathered at the World Hydrogen Conference is convinced that hydrogen's time must come. Fossil fuels will become expensive again; even today, their true price isn't revealed at the gas pump, where the numbers don't include the cost of pollution and the expense of protecting our interests in the Persian Gulf.

Other countries are less reluctant about hydrogen than the United States. Two years ago, Japan, an island nation frightened by the prospect of rising seas if the icecaps start to melt, unveiled a multibillion-dollar, 28-year program to form a global hydrogen system. The Japanese are talking power plants, cars, buses, planes, ships and rockets, all over the world, all fueled with renewable hydrogen.

And there's a recent surprise announcement by Daimler-Benz, the parent company of Mercedes-Benz, that has excited many people here: The German auto maker claims it has cleared the major obstacles to producing the first commercially viable hydrogen-powered automobile. Unless Mercedes is just trying to spook the competition, hydrogen's prospects have suddenly improved faster than anyone dared hope. The Mercedes in question runs on a fuel cell, a refillable device that, like a battery, chemically converts fuel directly to electricity without having to burn it. Fuel cells can function on methanol or natural gas, but with hydrogen, they're up to three times more efficient than conventional engines.

The most advanced models, including the one Daimler-Benz uses, come from the Vancouver-based Ballard Power Systems Inc., which designed fuel cells for the Canadian defense department, using technology NASA developed for the Gemini mission and then shelved. Originally large, boxy affairs of stackable metal plates separated by membranes resembling plastic wrap, Ballard's fuel cells are now small enough to fit inside a minivan chassis. ''when we start producing them in volume,'' says Ballard co-founder Keith Prater, a former University of Texas chemist, ''the price will shrink, too.''

Surrounded by conference booths promoting the latest in photovoltaics, fuel cells and electrolyzers—devices that separate water into oxygen and hydrogen—I asked Princeton physicist Joan M. Ogden if the United States is letting the future slip away to foreign competitors. She tells me of a recent, unreleased General Motors study admitting that non-polluting fuel cells could be mass-produced for the same cost as a conventional engine. ''Actually, they should cost less, because they have no moving parts,'' she says. ''They'll also last longer and be cheaper to maintain.'' But while Mercedes, BMW and Mazda race to bring a hydrogen car to market, U.S. auto makers, by comparison, don't seem very interested.

A few years ago, Ogden quit Princeton's glamorous fusion energy program to engage in relatively impoverished research in renewable hydrogen. ''Fusion will take decades,'' she told aghast colleagues. ''I want results in my lifetime.'' Soon after, she co-authored a book that proposed making hydrogen by splitting water with electricity from solar photovoltaic (PV) cells. (In this process, as electricity made from sunlight passes through a pair of electrodes immersed in water, hydrogen bubbles collect around one pole and oxygen around another.) Although PV is still expensive, Ogden argued that mass production and technological improvements would lower costs until they intersect with rising oil prices.

The book has been alternately praised and scorned, the latter because of a map showing how much of the United States would have to be covered by photovoltaic cells to produce sufficient hydrogen to meet the total U.S. annual energy needs. The area is

denoted by a circle that reaches from Albuquerque nearly to the Mexican border. Critics who derisively try to guess the value of all that real estate miss the point, she insists. No one ever suggested putting all the PV in the same place.

''Obviously, deserts are ideal, because they get the most sun, and minimal rainfall is enough to make plenty of hydrogen. But I did a little calculation once. Let's say 2,000 people who work at Princeton drive there every day. If I wanted to run their cars on hydrogen, how much roof space would I need to cover with PV to make enough hydrogen fuel for them? I figured that by putting panels on fewer than half the university rooftops, even with New Jersey's humble sunshine levels, we could convert all those cars to hydrogen. Think if we did that all over the country.''

That same afternoon, Peter Lehman, an environmental engineer from Humboldt State University in Northern California, tells me what it would take to do the same for the 9 million cars in the Los Angeles Basin: ''An area about 340 square miles. About two-thirds the size, say, of Edwards Air Force Base.''

Cover Edwards Air Force Base with shiny photovoltaic panels?

''Sure. It would mean a fairly dramatic reorientation of priorities, and a huge expenditure, probably like building the interstate highway system. That took $100 billion and 34 years. But we did it because as a society we decided it was important. Wouldn't you think that eliminating all smog might be important?''

All week, people here have been repeating a mantra of massive American investments in the future that paid off, like the Marshall Plan, the interstate highway system and—especially during a pilgrimage to the old Apollo launching pad—President Kennedy's decision to put men on the moon. Although these ventures involved enormous expense, they were embraced by the public because of visionary, daring leadership, but they also coincided, rather than conflicted, with powerful interests. A commitment to transform America's energy infrastructure to accommodate clean hydrogen would, I suspect, evoke awesome resistance from the petroleum and auto industries. And decisions these days seem dictated more by the global marketplace than by the foresight of leaders.

Yet the one vision these scientists from Argentina, Egypt, Russia, Germany and Japan tell me may save civilization from choking on its own exhaust emanates from California. They refer specifically, and reverently, to mandates by the California Air Resources Board and the South Coast Air Quality Management District, which require that zero-emission vehicles (ZEVs) constitute 2% of all cars sold in the state by 1998 and 10% by 2003.

The allure of these requirements is the fact that, with one out of 18 Americans living in the L.A. Basin alone, whoever can first manufacture a viable car that meets this standard will get rich. Everybody assures me that batteries aren't going to do it; the acceleration is rotten, the range is too short, and they must be recharged by plugging into dirty power plants that only shift the pollution elsewhere. The assumption here is that the only way to build a real ZEV is by using a hydrogen fuel cell, and California's regulations will help force that technology into existence. The air quality district's chief scientist, Alan Lloyd, who's speaking at the conference, agrees.

Lloyd's problem though, is that he is not exactly considered a prophet in his own land. Rather than instilling native pride, California's world champion air-quality laws, which some believe have wrecked the state's economy, have barely survived legislative plots to scuttle them.

And despite the vaunted environmental pedigree of Vice President Al Gore, the Clinton Administration hasn't been much help either. While a few projects like experimental wind farms have been encouraged, federal efforts have focused more on improving energy efficiency than on developing clean new sources. Most frustrating to Alan Lloyd is a multimillion-dollar Administration program called PNGV: The Partnership for a New Generation of Vehicles, whose goal is to deliver a prototype car that gets triple today's expected gas mileage—about 80 miles per gallon—by the year 2004. ''Which means that after 10 years, they'll develop a vehicle that will be illegal in California because it's too dirty,'' he says, gazing heavenward. ''That's unacceptable. A new-generation vehicle should be fuel-efficient and clean. Leadership should come from the White House, but their agenda is being driven more from Detroit.''

Other energy advocates claim the technology for an 80-m.g.g. vehicle already exists, but the Administration has simply caved in to the Big Three auto makers and the oil industry. But since I haven't seen filling stations dispensing hydrogen on American street corners, I ask Lloyd if a fuel-cell vehicle designed to run on the stuff is really practical.

In the interim, there are lots of ways to make hydrogen besides solar energy, Lloyd explains. Using steam, it can be derived from natural gas or even mixed with it—known as town gas, that was what America once burned for light and cooking. Hydrogen improves the potency and lowers the emissions of natural gas, and with some modification it might even be shipped through natural gas pipelines. As for a dearth of service stations: a similar alarm was once sounded by buggy-whip manufacturers.

The real obstacle, Lloyd says, is America's current lust to pawn the future for the sake of profits today. ''While Detroit hires 100 attorneys to defeat every new emissions standard we establish, Japan assigns 1,000 engineers to meet the challenge.''

Maintaining energy's status quo might make some sense, or at least some money, for purveyors of petroleum and internal-combustion engines. But the conference's keynote speaker assures us that the decision won't really be theirs. University of Colorado physicist emeritus Albert A. Bartlett says he knows little about hydrogen but something about basic arithmetic. He's particularly drawn to calculating the time it takes for things to double. This is pertinent, he says, to consumption of fossil fuels, because it allows the petroleum and coal industries to deceive the world about how long those resources will actually last.

To illustrate what he means, he proposes that we imagine a species of bacteria that reproduces by dividing in two. Those two become four, the four become eight, and so forth. ''Let's say we place one bacterium in a bottle at 11 a.m., and at noon we observe the bottle to be full. At what point was it half full?'' The answer, it turns out, is 11:59 a.m.

''Now, if you were a bacterium in that bottle, at what point would you realize you were running out of space? At 11:55 a.m., when the bottle is only one-thirty-seconds full, and 97% is open space, yearning for development?''

Everyone giggles. ''Now suppose, with a minute to spare, the bacteria discover three new bottles to inhabit. They sigh with relief: They have three times more bottles than had ever been known, quadrupling their space resources. Surely this makes them self-sufficient in space. Right?''

Except, of course, it doesn't. Bartlett's point is that in exactly two more minutes, all four bottles will be full. Likewise, when President Jimmy Carter noted that in each of three previous decades the world had burned more fuel than had been consumed previously in all of history, it meant that fuel consumption was doubling every decade. That rate slowed temporarily with the energy crisis, but now, with world population rising and today's breakneck industrialization in the Third World, the exponential gobbling of limited resources is again accelerating.

''It's seriously misleading when we hear, for example, that at current levels of output and recovery coal reserves can be expected to last 500 years. We get the mistaken impression that there's 500 years' worth of coal left, forgetting that the sentence began with 'at current levels.' That's 500 years, only if there's no growth of production.''

And petroleum? ''In 1993, they announced the largest discovery of oil in the Gulf of Mexico in the last 20 years: 700 million barrels. It sounds like an enormous number, until you realize that we Americans go through roughly 17.7 million barrels a day. Divide 700 by 17.7. It'll last about 40 days.''

The auditorium is now silent. ''That indicates,'' he tells us, ''that we've already made the big petroleum discoveries. Now we're picking around the edges, getting the last ones.''

In 1975, during the depths of the energy crisis, Tom Harkin arrived in Washington as an Iowa congressman. In his first year on the House Science and Technology Committee, he decided that the threat to the future of energy was genuine. Then Carter was elected President, and, to Harkin's relief, the Administration began dispensing billions and creating incentives for solar, photovoltaic, wind and ocean thermal energy.

Then the next President, Ronald Regan, dismantled Carter's solar-heating apparatus on the White House roof and all the tax breaks and funding for alternative-energy research along with it. During those lean years, Harkin, now a senator, joined forces with longtime hydrogen zealot Sen. Spark M. Matsunaga of Hawaii to convince whomever they could that hydrogen wasn't some dumb fantasy. After Matsunaga's death in 1990, Harkin and the only other hydrogen devotees around, Reps. George E. Brown, Jr. (D-Colton) and Robert S. Walker (R-Pa.) and Sen. Harry Reid (D-Nev.), pushed through a five-year research bill in his memory.

The appropriation was minimal, but after Clinton and Gore were elected, Harkin was sure that would change. Shortly after their inauguration, he presented the new Administration with a 40-page proposal for a sustainable energy future based on hydrogen. It showed how, by using solar photovoltaic electricity to split water, hydrogen actually becomes a way to store the power of the sun, because it can be burned at night or shipped to cold climates where solar energy is scare. It explained that the cheapest way to produce hydrogen could be through ''electrofarming'': using marginal land to grow energy crops like switch grass, which could be reduced to hydrogen in a simple device called a biomass gasifier. The gasifier, in turn, would run on excess heat from a hydrogen fuel cell, providing power for the farm.

Harkin also rebutted the myth that hydrogen is more dangerous than traditional fuels, a belief dating to the 1937 explosion that destroyed the German airship Hindenburg. The 36 who died, he explained, were killed in the falll, not from burning hydrogen, which simply floated away (as it would have had the Exxon Valdez transported hydrogen instead of oil). In fact, the 61 Hindenberg survivors

would not have lived had the blimp carried natural gas.

But, Harkin concluded, in order to make fuel cells or hydrogen cars affordable, they have to be mass-produced, and before manufacturers will mass-produce them, delivery systems-hydrogen pumps at the corner gas station-have to be in place. That won't happen until there's mass demand for them, and so on. This classic chicken-and-egg dilemma, he argued, could be resolved by a federal commitment to a comfortable transition from fossil fuels.

He didn't get very far. ''I told the President he should grab the public's imagination the way Kennedy did with the moon shot, by announcing in his first State of the Union speech that the U.S. was going all out for hydrogen and fuel cells. He looked at me like I was slightly nuts.''

Later Harkin ran into Al Gore in the Executive Office Building. If the government purchased large quantities of photovoltaics, he told the vice president, it would lower the cost immensely. The same for fuel cells. No luck there, either. Instead, the tiny hydrogen coalition in Congress actually has had to fight the Administration's proposed cuts in funding provided by the Matsunaga Act.

In Washington, Harkin's hydrogen consultant, Sandy Thomas, shows me a chart of the Department of Energy's budget. Out of $18.6 billion, $10 billion goes for nuclear-weapons research and cleanup. ''That's even though we aren't building nuclear weapons anymore. It's an upper-middle-class welfare program for nuclear scientists. Then there's nearly $1 billion for fossil-fuel research and conservation, even though they're running out; $300 million for atomic fission, though we've stopped building nuclear reactors, and nearly half of a billion for fusion, the practical application of which even its most optimistic proponents admit it at least 40 year away.''

''And for hydrogen research?'' I ask.

''Ten million.

I gape. ''I know,'' he says. ''We've argued for shifting even $100 million out of DOE's nuclear-weapons fund. But those decisions are made at the top. It's hard to get Hazel O'Leary's ear on this one.''

At a White House conference on environmental technology in December, chaired by Gore, Energy Secretary O'Leary admits to me that in the wake of a new Republican Congress that threatens to cut not just budgets but the entire DOE, she questions the wisdom of bank rolling fission. On hydrogen, however, she doesn't yield. ''I'm not an apologist for traditional energy. We've backed some exciting research into wind power. But my strong opinion is that hydrogen isn't there yet. We have to be willing to deliver more mature technologies to market first. Excepting fusion, I think our investments fairly represent the energy marketplace for the near and midterm.''

At the conference, Gore, five Cabinet officers and President Clinton's science adviser meet with 1,400 industrialists, entrepreneurs and environmental representatives to discuss how the U.S. can prosper in the growing international market for clean, green technology. There are seminars on environmental export financing and transitions to industrial ecology—yet barely any mention of energy, except for a small workshop on fuel cells and another on transportation technologies.

In the latter, I join a study group chaired by Ford's representative for the Partnership for a New Generation of Vehicles. Among the points we've asked to consider are the prospects for introducing alternative fuels like hydrogen for motor vehicles in the near future. The first to speak up is General Motors' federal research coordinator. ''Very dim. As long as gas and diesel stay around $1.20, consumers have no incentive to use anything else.'' Alternative fuels, he says, all lack the energy density of petroleum, so it will always cost more to get the same amount of power.

No one contradicts him, so Ford moves on to the next question. I interrupt. ''Wait, Isn't the whole reason for this conference the idea that consumer demand today involves things other than price, such as products that don't pollute us to death?''

''I'll believe that,'' GM replies, ''when Californians start buying the 50 miles-per-gallon vehicles that are already available. The fact is, they don't want cars that are more efficient or cleaner.''

''So how would you get people to buy this thing?'' I yell to Thomas Klaiber, but he doesn't hear me, because a low-slung, Class C racing series model and a black, V–12 600SL roar past us at that instant, one on either side. We're on the Mercedes-Benz test track in Stuttgart, Germany. Klaiber, a mechanical engineer, is head of the Daimler-Benz hydrogen fuel cell group, the van he's driving is the hydrogen-powered vehicle that prompted Mercedes' grand announcement.

If this is really the future we're driving into, at a top cruising speed of 50 miles per hour, it's a little like riding the tortoise while being passed by a flock of jeering hares. Even Mercedes buses are passing us as we negotiate banked curves and climb steep little hills that suddenly appear in the middle of the straightways. Yet the van itself feels surpringly normal. Amid the surrounding internal combustion thunder, the most noticeable difference is how quietly it runs. The fuel cell itself make no sound. There's only the hum of an air compressor.

Some significant technology challenges remain unmet, however. Much of the cargo area is filled with fiberglass pressure tanks. Although hydrogen has up to three times the efficiency of gasoline, its lightness gives it such low density that even when compressed. its storage requires at least four times the space of a conventional gas tank. This is fine for the fuel-cell buses that Ballard Power Systems is operating successfully in Vancouver, because there's plenty of room on their roofs to store hydrogen. To partly alleviate this problem for passenger cars, Daimler-Benz plans to shrink the fuel cell to one-fourth it current size, even as it increases horsepower.

''The alternative is we store the hydrogen in metal hydrides,'' Klaiber says, referring to a process in which certain metals absorb hydrogen like a sponge, then release it when heated. ''They're fine for commuter cars; citizens tested a fleet for us in Berlin for four years. But for a range of 250 miles, you'd need a ton of hydrides. Too much.''

I have just come from Munich, where I rode in a silver 7-Series BMW that uses a third storage option, liquid hydrogen, exactly like the space shuttle. Its ride, acceleration, speed and internal combustion engine made it virtually indistinguished from a regular car. Underneath the chassis, however, was a doubled-walled tank to keep the fuel at −423 degrees F. But even with that much insulation, too much hydrogen boils off after three days, making it impractical, say, to leave a liquid hydrogen car in an airport parking lot during summer.

Plus, it takes one-third the energy of hydrogen to cool it to a liquid state. So the simplicity and high efficiency of fuel cells, which runs at normal temperatures, seem to be winning the race to the future-whenever that is.

Riding with Klaiber, it doesn't feel distant. His face is glowing, almost cherubic. He confesses that he loves driving this thing just because he knows it's so clean.

We pull over. He doesn't turn off the engine but finds a paper cup and holds it over the exhaust pipe. ''Drink?'' he offers.

It's pure, distilled water.

Consumers, I'm told by hydrogen skeptics, won't buy a vehicle whose power and performance fall short of what we've grown to expect from our automobiles. In the Daimler-Benz headquarters, Mercedes' vice president of marketing for passenger cars, Jochen Placking, shows me a typical ad they use for the United States: a convertible speeding across a New Mexico desert. ''We're selling freedom. The limitless power to go explore.''

In the halls here, decades of Mercedes advertising posters show women with long, shapely legs protruding from fur coats, leaning against gorgeous roadsters. How can you make an environmentally correct car into a sexy status symbol, like a sports coupe?

Placking strokes his mustache. ''We'll have to find a way to make clean cars fascinating,'' he says. ''Like selling people on safe sex.''

It's not an altogether encouraging analogy, especially in the context. Germany, world leader in hydrogen research investment—about $12 million a year since the late 1970s until it was blindsided by the expense of reunification—is hardly the renewable-energy economy I imagined. An official from the state of Bavaria's electric utility, which has the world's biggest hydrogen pilot facility, admits there are no plans to scale up to a full-sized working plant. So what will they do in 30 years, when Bavaria's aging nuclear plants mut be phased out and fossil fuels are expected to be scarce?

''I can't answer that question. Nobody can. Nobody gives a damn about the future.''

Back in my own country, I share this story with Michael Heben, a lanky young materials scientist at the National Renewable Energy Laboratory. Even at BMW and Daimler-Benz, I tell him, hydrogen only gets a small chunk of the research budget compared to conventional engines. I suppose it's not in a company's interest to invent something that renders its most successful product obsolete.

Heben shrugs. He reminds me we've seen computers grow smaller, faster and cheaper at a breathless pace, all because a couple of kids in a garage dared to try to build something better. When Edison was inventing light bulbs and phonographs, electricity cost 300 times what it does now. As soon as people saw what it could do, they started using it en masse, and the price became practical. Maybe, he suggests, one key discovery will do the same for hydrogen—like the semiconductor work of John Turner, who's splitting water without the intermediate step of first making photovoltaic electricity.

Other researchers here are cultivating strains of algae that exhale hydrogen. Heben himself is after a revolutionary way to store it. He's trying to prove that submicroscopic tubes made of activated carbon, developed at IBM, suck up hydrogen atoms via capillary action, like a straw. A fuel tank full of the tough, light tubules, each about a billionth of a meter in diameter, could actually hold far more diffuse hydrogen gas than a tank that was empty.

''Our goal should be a vehicle that performs like today's cars: same size, weight, acceleration, frequency of refueling. With good, compact, energy-efficient storage, there's no reason we can't do that with clean hydrogen.''

On NREL's lean hydrogen budget, he's currently able to create enough of a soot-like substance, which contains carbon nanotubules, to coat the inside of a countertop bell jar. To scale up to working size will cost a lot more. At this point, he has no idea where funds will come from, but something makes him believe they will.

''We're so close. so much has been accomplished with just a little. If we really decided that we wanted a clean hydrogen economy, we could have it by 2010. No more oil spills. Fresh air in Denver and L.A. Think of it.''

Maybe he's right. Curiously, amid panic over Republican threats to dismember research budgets, hydrogen may prove to be not just a survivor but also a winner. The new chairman of the House Committee on Science is Bob Walker, longtime science mentor to House Speaker Newt Gingrich and hydrogen ally of Tom Harkin.

In his office, decorated with pictures of the space shuttle, Walker reminds me that one of the most powerful forces in the marketplace is ''the love Americans have for roaming the planet freely in their own cars. Hydrogen will make that possible when the present technology gets too dirty to extend into the future.'' He has introduced legislation calling for a quadrupling or research funds for hydrogen over the next three years. Part of the money will be matched by nonfederal sources and part expropriated from technologies. Walker believes are either futile or outmoded.

He has little pity for industries that resist change, including auto makers. ''If Edison were to invent the light bulb today, the headlines would read, '200,000 candle makers lose their jobs.' We've been through this before, like when cars put blacksmiths out of business. It's wrenching, but overall our national competitiveness gets stronger. The same thing will happen in energy. The people themselves will demand it.''

He pauses to gaze at a plaque naming him the latest recipient of the National Hydrogen Assn.'s Spark M. Matsunaga Award. ''Driving on the interstate, I watch them stringing fiber-optic cable up the median strip for the Internet. The government talks about the Internet but can't come up with a structure. Meantime, it's happening because people want it. When they realize they need clean hydrogen, somebody will find a way to supply that, too.''●

THE ADMINISTRATION'S MIGRATION AGREEMENT WITH CUBA

● Mr. SIMON. Mr. President, a couple of weeks ago, the administration concluded a migration agreement with Cuba that I hope will be the first step in the direction of a rational policy toward Cuba.

Under this agreement, most of the 15–20 thousand Cubans that have been housed in Guantanamo Bay for the past several months will be paroled into the United States, with those paroles to count, on a 3-year prorated basis, against the 20,000 minimum Cuba-to-America immigration numbers agreed upon by the Cuban and American governments last fall. Cuba has also agreed to accept back those Cubans at Guantanamo who are excludable under U.S. law because of criminal histories, infectious diseases, etc. Thus, within the limits set out in last fall's agreement between Cuba and the United States, this agreement has solved the costly and potentially explosive detention of the Cubans at Guantanamo.

As part of this new policy, the Attorney General has also announced that those attempting in the future to emigrate to the United States from Cuba illegally—rather than through the process agreed upon last year—would be subject to interdiction and forced repatriation to Cuba, from where they could apply for asylum at the Cuban Interests Section in Havana.

Although I have some concerns about the second half of this new approach—in particular, the policy of interdiction and repatriation of future migrants from Cuba—and urge the Attorney General to implement sufficient procedural protections for those Cubans with valid asylum claims, in general I view this agreement as a significant step forward in our relations with Cuba.

Unlike our policies toward Cuba over the past 35 years, the agreement represents a rational and cooperative response to a U.S.-Cuba immigration problem that has caused this Nation nothing but headaches in the past. If our government could approach every U.S.-Cuba issue with the pragmatism that is reflected in this agreement, I believe that our long-sought goal of democratization of Cuba would be much closer to our grasp than this goal is now.

I ask to have printed in the RECORD a May 4 editorial on the agreement with Cuba from the Chicago Tribune. This editorial ends with a call to President Clinton to apply the tools of constructive engagement in our relations with Cuba, and recognizes that these tools, not a doctrinaire and obsolete policy of Castro-baiting, hold the keys to a successful Cuba policy.

The editorial follows:

[From the Chicago Tribune, May 4, 1995]

A WELCOME CHANGE IN CUBA POLICY

Ever since 1959, when Fidel Castro descended from the Sierra Maestra to enter Havana spewing Marxism like cigar smoke, Cuba has been a misplaced comma that jumbled an otherwise cogent political essay called the Monroe Doctrine.

In a commendable turn of direction. President Clinton reinjected logic into U.S.-Cuba relations by ending 35 years of preferential treatment for Cuban refugees. Clinton ruled Tuesday that Cubans will no longer receive automatic asylum but must pass the same hurdles as any other refugee reaching our shores.

Although Clinton's decision will be analyzed in terms of the Cuban-American vote and hemispheric diplomacy, its inspiration was purely practical.

At present, 20,000 Cuban refugees are stuck in tents at the Guantanamo Bay Naval Station; their $1 million-a-day tab for room and board comes from the Pentagon budget, which means the taxpayers' pockets.

The refugees are getting restless. Clinton wants to avoid ugly riots, so a final exemption will be granted to accept that group. Any other ''raft people'' will be turned back to Cuba.

Clinton has firmly announced that this nation, not Castro, controls America's borders. In addition, Clinton has denied Castro the foreign policy weapon of ''boatlift diplomacy,'' which capitalizes on the pitiful sight of refugees foundering abroad unseaworthy craft en route to the promise of Florida's beaches.

There are two glaring holes in the president's program, however.

First is a threat that anyone among the Guantanamo refugees with a criminal record will be denied entry. What's this? Clinton thinks Castro is going to open up his secret police files for perusal by Immigration and Naturalization Service officers? Doubtful.

And second is the quid pro quo from Castro, who has promised to allow his people free access to the American interest section in Havana. There they may file a formal request for U.S. entry, which will be weighed by the INS like those of potential immigrants worldwide. But Catro's promise may be meaningless. In Cuba, one of the last remaining communist states on Earth, pressures both subtle and overt can be applied to frighten away potential applicants.

By ending three decades of automatic asylum for Cubans, Clinton has demoted Castro from top devil of the Caribbean, much to the heartfelt anguish of expatriate Cubans and Cuban-Americans.

If that is to be Clinton's new policy, then it is time to apply the tools of constructive engagement—as with China, a few steps at a time—using the full range of American diplomacy, trade and culture to push Cuba toward democracy and a rational relationship with its giant northern neighbor.

SPEECH OF AMY BRINDLEY TO STRIKING UNITED RUBBER WORKERS

● Mr. HARKIN. Mr. President, today I would like to submit into the RECORD a statement from a 16-year-old in Des Moines named Amy Brindley. Amy is the daughter of a striking URW member who works at the Bridgestone/Firestone plant in Des Moines. She gave this moving speech in April to a rally of striking workers and their families. I think all Senators should read the words of this impressive young American. I ask that her statement be printed in the RECORD at this point.

The statement follows:

SPEECH BY AMY BRINDLEY

As a teenage daughter of a United Rubber Worker, who's been on strike for the past 9 months, I'd like to point out that this strike involves many, many people and is just NOT limited to the union members and their employer. Bridgestone/Firestone has invaded the lives of the entire family with their inexcusable hunger for corporate greed.

I feel that is important to recognize the numerous family members who have fallen victim to the ruthless demands set forth by Bridgestone/Firestone.

Being a teenager is never easy, but having to deal with the additional stress this labor dispute has brought about, has made it even more challenging. Many friendships have been broken apart throughout this strike. I, myself, have had friendships that have suffered great setbacks because of my pro labor beliefs. I believe that it is the lack of education that a lot of people have concerning the Union. I strongly believe that we need to educate and promote the values and the importance regarding unions. As members of the United Rubber Workers are attempting to hold on to what fellow members have fought to gain in the past years of joining together at the bargaining table. If we don't educate people, what will the future hold, not just for my generation but the following generations also?

I am a junior at Southeast Polk High School. As juniors, we are offered the opportunity to go to Washington D.C. and New York for the United Nations Trip. This trip is only offered to juniors. Because of the strike it was financially impossible for me to go with my fellow classmates. It was very